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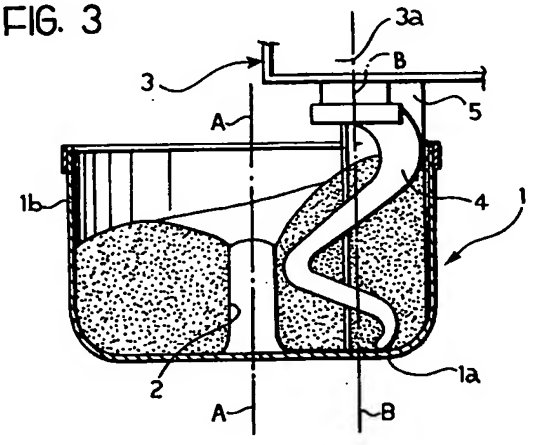
(54) A kneading machine for food products.

(57) A kneading machine for foodstuffs, in particular flour-based mixtures, comprising a kneading tank (1) which is rotatable about a first vertical axis (A) and has an upwardly projecting coaxial column (2) movable with the tank (1), a fixed support structure (3, 3a) adjacent the rotary tank (1), and a spiral-type kneading tool (4) which is rotatable inside the tank (1) about a second vertical axis (B) at a distance from the first axis (A). The machine also comprises a fixed counter member (5) rigidly connected to the support structure (3), consisting of an arcuate wall disposed coaxially to the envelope of the spiral tool (4) and intended to form a narrow passage (10) between this wall (5) and the spiral tool (4) which projects along an arcuate section substantially tangential to the envelope of the spiral tool (4) such that the amount of time the mixture remains in contact with the spiral tool (4) is increased and the mixture is also subjected to a force of compression towards the base (1b) of the tank (1).

FIG. 3



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The present invention relates to a kneading machine for foodstuffs, in particular flour-based products, comprising:

- a kneading tank which is rotatable about a first substantially vertical axis, said tank being provided with an upwardly projecting coaxial column movable with the tank;
- a fixed support structure adjacent the rotary tank;
- a spiral-type kneading tool which is supported by the support structure, so as to rotate inside the tank about a second substantially vertical axis at a distance from the first axis.

Kneading machines of the above-described type, commonly known as spiral kneading machines, are already known.

Figures 1 and 2 show schematically a lateral partial cross-section elevation and a plan view of a conventional spiral kneading machine. In these Figures, 1 designates the kneading tank which is rotatable about a vertical axis A, and is provided with a central column 2 coaxial with the tank 1 and projecting towards the top of the tank 1. A fixed support structure 3 is disposed adjacent the tank 1 and comprises a head 3a which projects in cantilever form above the tank 1, and supports a spiral-type kneading tool 4 which is rotatable inside the tank 1 about a second substantially vertical axis B at a distance from the first axis A.

These known spiral-type kneading machines process one batch of product to be kneaded at a time, and during this processing the rotation of the tank gradually brings the various portions of product into contact with the tool, until the required features of the mixture are obtained. However these known machines require a kneading time which for some preparations may be excessively long and may give rise to undesirable heating of the product.

A kneading machine is also known from FR-396464, of the type comprising a rotary tank provided with a central column coaxial with the tank, and a kneading tool which is rotatable inside the tank, and which has a central cylindrical body from which two blades project, each of which comprises a substantially flat and radial plate. A wall having an arcuate form is disposed in such a manner that it partially surrounds the kneading tool, such that each time the outer ends of the blades pass close to the vertical wall, they displace and divide between them portions of dough. The vertical wall thus serves the purpose of compressing and breaking up any lumps present in the mixture and of cutting the dough into pieces by subjecting it to compression against this vertical wall.

The object of the present invention is to provide a kneading machine of the type indicated initially in the present description, the kneading time of which is substantially shorter than that required for kneading machines of the known type, without however further complicating the design and / or increasing the cost substantially.

This object is achieved in that the machine also comprises a fixed counter member rigidly connected to the support structure, consisting of an arcuate wall disposed coaxially to the envelope of the spiral tool, said counter member being intended to form a narrow passage between said wall and the spiral tool which projects along an arcuate section substantially tangential to the envelope of the spiral tool, such that the amount of time the mixture remains in contact with he spiral tool is increased, and the mixture is also subjected to a force of compression towards the bottom of the tank.

By means of this feature, the kneading machine according to the present invention increases the time for which the mixture is retained in contact with the kneading tool, and is subjected by the latter to a force of compression against the bottom of the tank, thus reducing drastically the kneading time such that it is only approximately a third of the time required for conventional spiral machines, and consequently also reducing the heating of the mixture, all of which involves a very simple structural alteration compared with conventional machines, at an almost negligible cost.

Further features and advantages of the present invention will become apparent from the following description with reference to the appended drawings provided purely by way of non-limiting example, in which:

- Figures 1 and 2 are respectively a lateral partial cross-section elevation and a plan view of a kneading machine according to the prior art;
- Figures 3 and 4 are views similar to Figures 1 and 2 of a machine according to the present invention;
- Figures 5 and 6 are enlarged plan views of a first embodiment of the invention;
- Figures 7 and 8 are views similar to Figures 5 and 6, showing a variant embodiment of the kneading machine according to the present invention.

With reference to Figures 3 and 4, a kneading machine for foodstuffs, in particular flour-based mixtures, comprises a tank 1, which in the non-limiting example illustrated comprises an upwardly projecting central column 2 rotatable about a substantially vertical axis A. A support structure 3, which is fixed relative to the rotary tank 1, comprises a head 3a which projects in cantilever form above the tank 1 such as to support rotatably a rotary spiral-type kneading tool 4, driven by a motor unit of a known type and not illustrated in the

Figures.

The head 3a also supports an arcuate wall 5 which projects vertically as far as the vicinity of the bottom of the tank 1, and surrounds part of the envelope of the spiral tool 4, such that a narrow passage 10 is defined between the wall and the envelope of the spiral tool. This narrow passage 10 extends along an arcuate section adjacent the envelope of the spiral tool 4, which is preferably, but not necessarily at least 45°.

With reference to Figures 5 and 6, the wall 5 is provided on its side opposite the kneading tool 4 with a blade 6 attached rigidly to the wall 5, for example by means of screws 6a consisting of synthetic material, the purpose of which is to scrape the mixture away from the lateral wall of the tank 1.

In the embodiment illustrated in Figure 6, the wall 5 comprises a section 5a interposed between the spiral 4 and the lateral wall of the tank 1, corresponding to the plane on which the rotational axis of the tank A and the rotational axis of the kneading tool B are disposed. In this case the compression force exerted by the dough, which is entrained by the tool 4 and by the tank 1 as they rotate, is exerted entirely on the section 5a of the wall 5, thus eliminating stress on the lateral wall of the tank 1, and consequently irritating vibrations of the tank 1 as it rotates.

Figures 7 and 8 are a variant embodiment respectively of Figures 5 and 6, in which the wall 5 comprises a component which has a substantially triangular plan form and includes a connection section 7 extending radially towards the lateral wall of the tank 1 such that the mixture which emerges from the narrow passage 10 cannot come to a standstill between the wall 5 and the lateral wall of the tank 1. In use the tank 1 rotates for example according to the arrow C in an anti-clockwise direction in the Figures. The spiral tool 4 also rotates anti-clockwise, as indicated by the arrow D, about the substantially vertical axis B. The mixture in the tank comes into contact with the tool 4, and owing to the centrifugal force tends to escape from the tool, however the wall 5 opposes this escape and forces the mixture to remain longer in contact with the tool 4. The mixture thus fills the central aperture of the spiral tool 4 which, owing to its helical form and its rotation, forces the mixture towards the base 1a of the tank 1, such that the product to be kneaded accumulates (as shown in Figure 3) in the vicinity of the tool 4, showing that the mixture is maintained longer in contact with the tool 4 owing to the presence of the wall 5, thus permitting very efficient kneading and a drastic reduction of the kneading time (by approximately 60%).

Claims

1. A kneading machine for foodstuffs, in particular flour-based mixtures, comprising:
   - a kneading tank (1) which is rotatable about a first substantially vertical axis (A), said tank (1) being provided with an upwardly projecting coaxial column (2) movable with the tank (1);
   - a fixed support structure (3, 3a) adjacent the rotary tank (1);
   - a spiral-type kneading tool (4) which is supported by the support structure (3, 3a) so as to rotate inside the tank (1) about a second substantially vertical axis (B) at a distance from the first axis (A), characterised in that the machine also comprises a fixed counter member (5) rigidly connected to the support structure (3, 3a), consisting of an arcuate wall disposed coaxially to the envelope of the spiral tool (4), said counter member (5) being intended to form a narrow passage between said wall and the spiral tool (4) which extends along an arcuate section substantially tangential to the envelope of the spiral tool (4) such that the amount of time the mixture remains in contact with the spiral tool (4) is increased and the mixture is also subjected to a force of compression towards the bottom (1b) of the tank (1b).

2. A machine according to Claim 1, characterised in that the narrow passage (10) surrounds the envelope of the spiral tool (4) for an arc of at least 45°.

3. A machine according Claim 2, characterised in that part (5a) of said fixed counter member (5) intersects the plane defined by the rotational axis (A) of the tank (1) and the rotational axis (B) of the spiral tool (4).

4. A machine according to Claim 3, characterised in that from the end of this fixed counter member (5) at a greater distance from the said plane defined by the rotational axis (A) of the tank (1) and by the rotational axis (B) of the spiral tool (4), there projects a connection section (7) disposed substantially radially towards the lateral wall of the tank (1).

FIG. 1

PRIOR ART

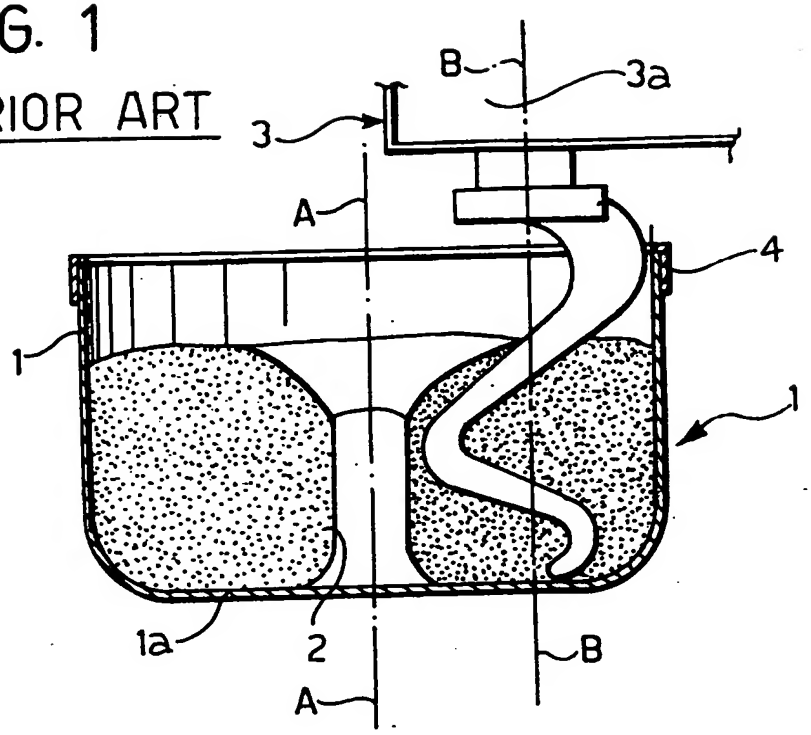


FIG. 2

PRIOR ART

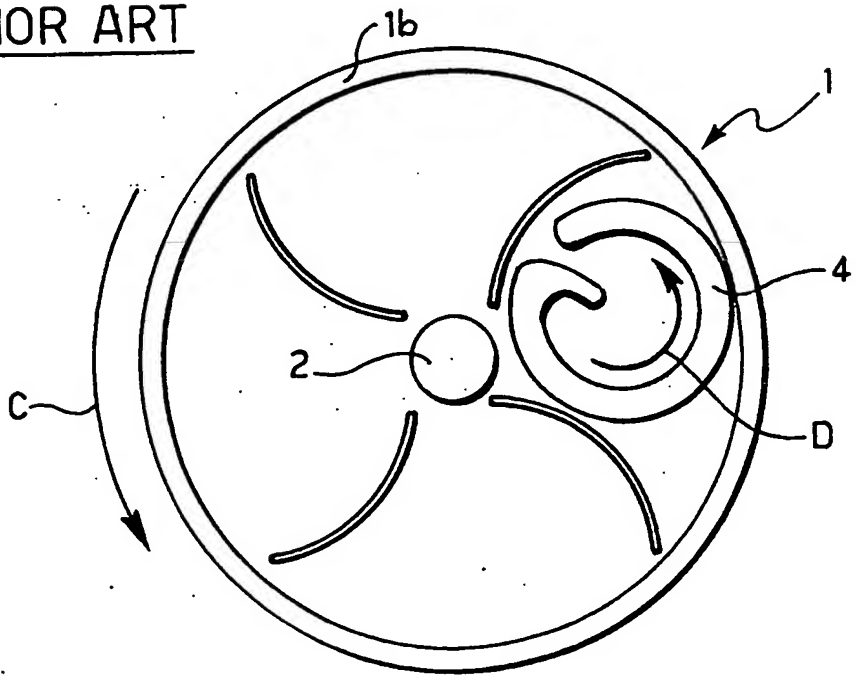


FIG. 3

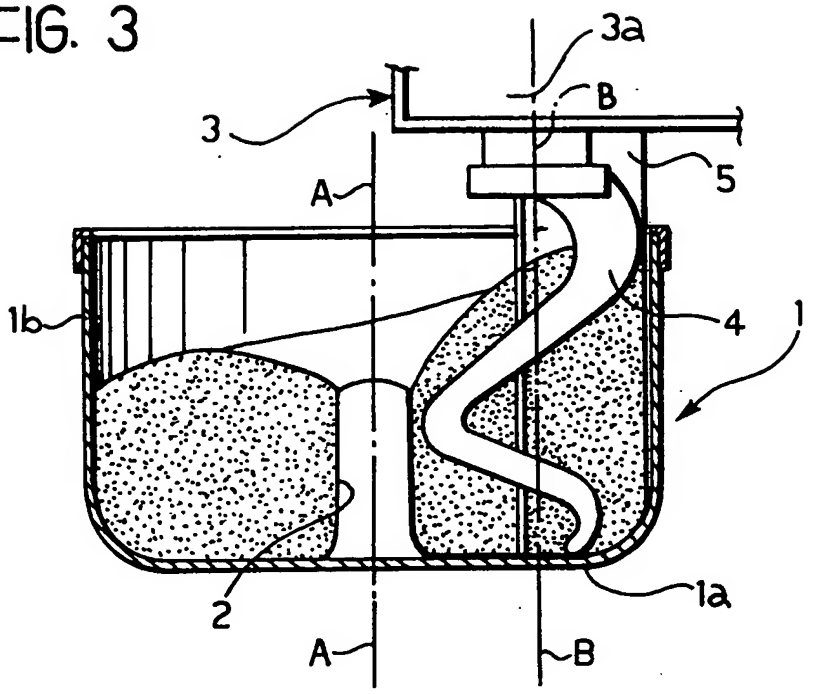


FIG. 4

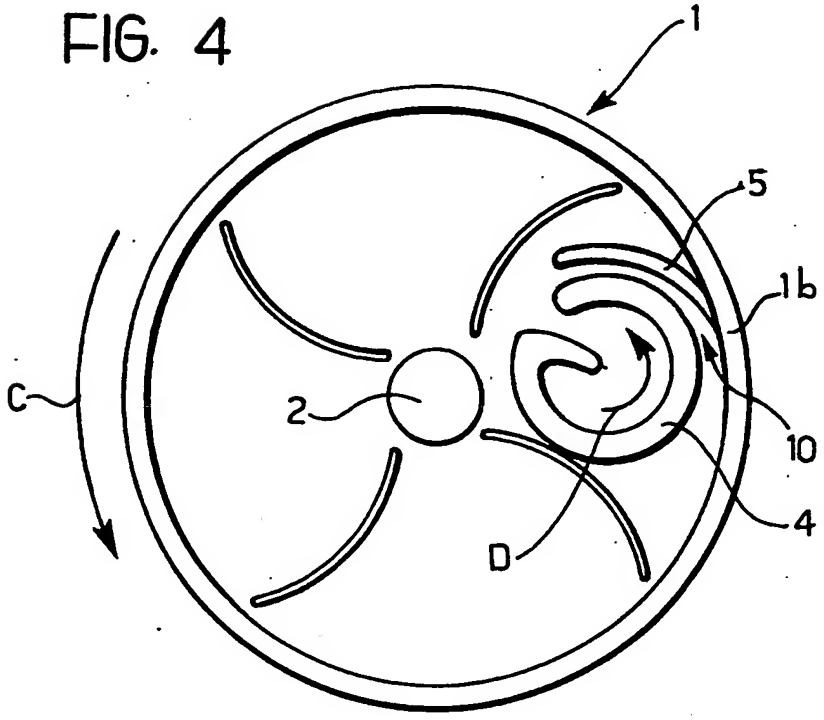


FIG. 5

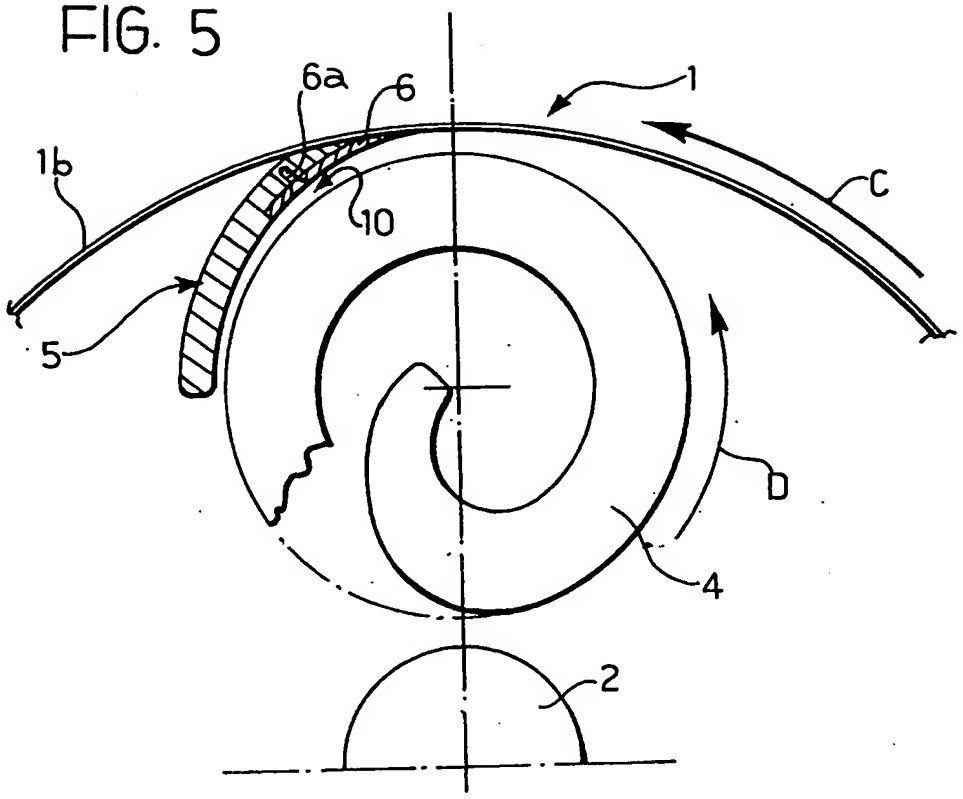


FIG. 6

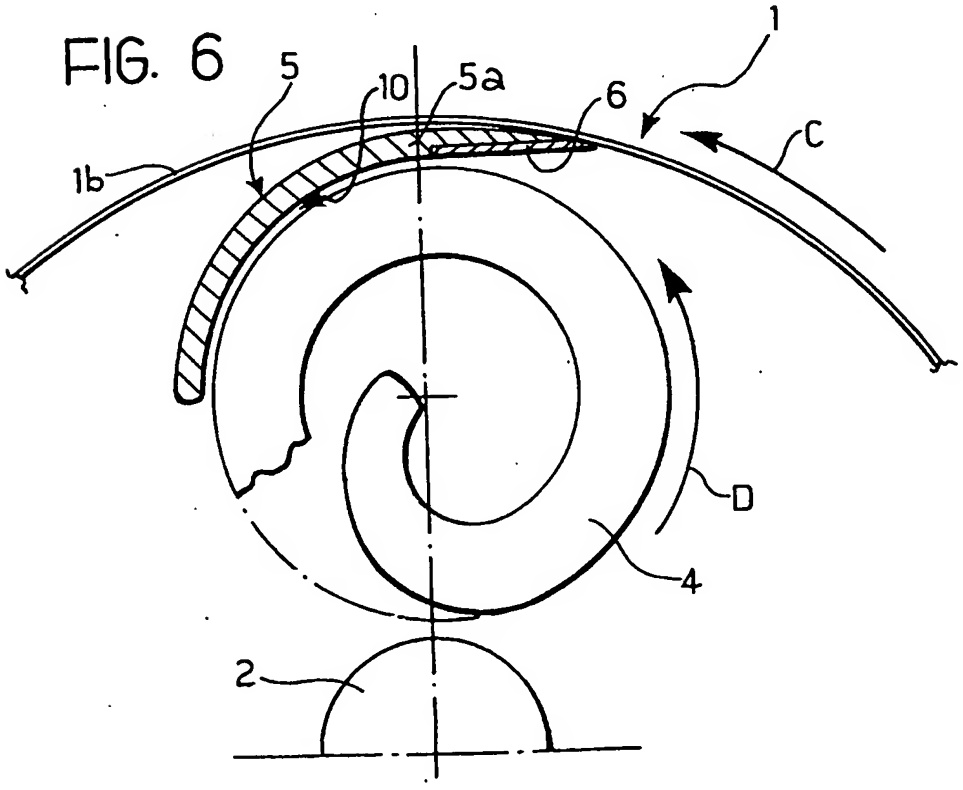


FIG. 7

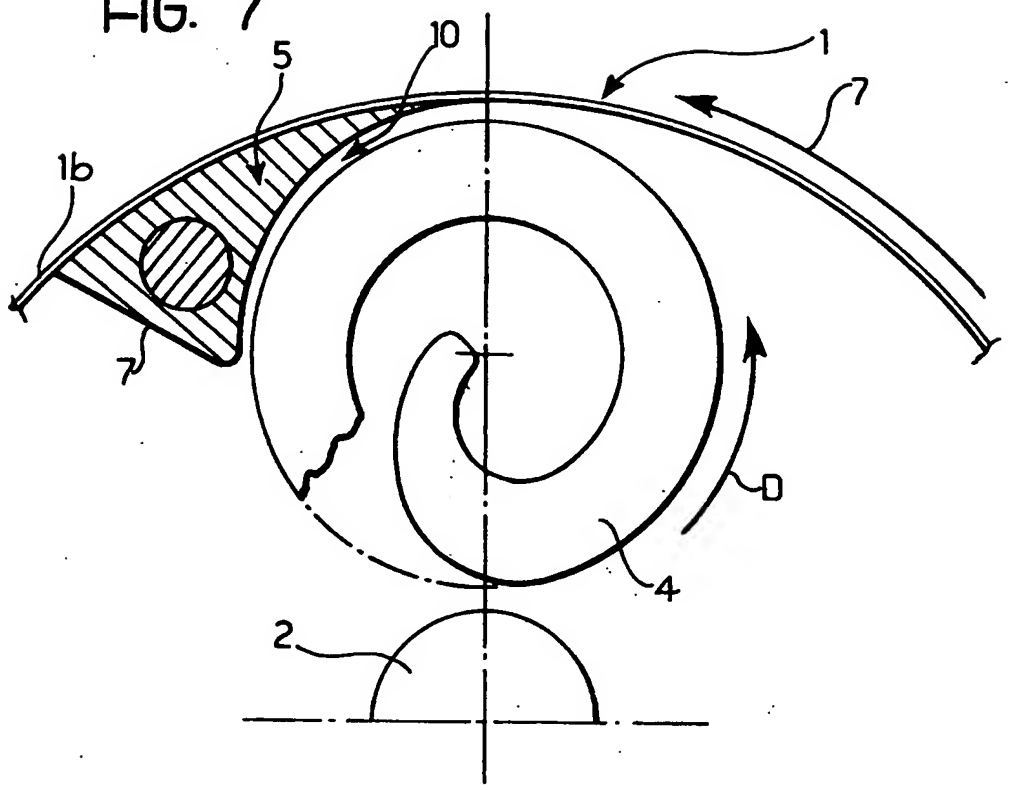
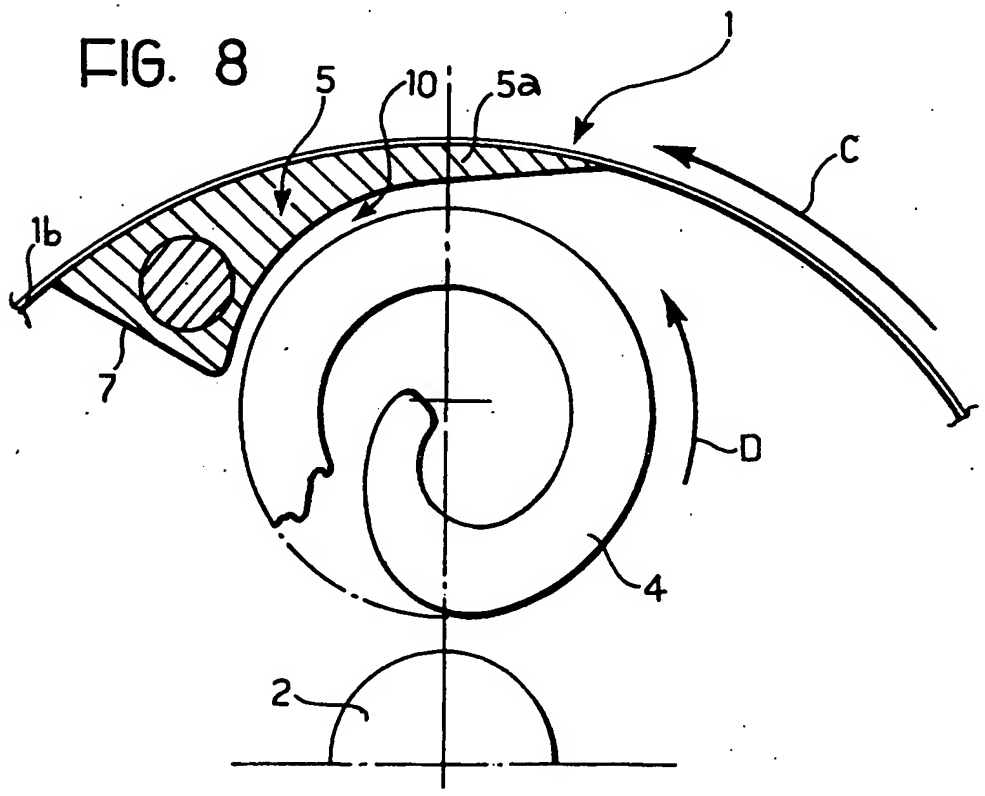


FIG. 8



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EUROPEAN SEARCH REPORT

Application Number

EP 92 11 7385

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A,D	FR-A-396 464 (PAULET)	1	A21C1/02
A	DE-B-1 298 466 (KEMPER)		
A	FR-A-425 071 (JOUVENCEL)		
A	FR-A-418 780 (MILLOU)		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

A21C
B01F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	18 MARCH 1993	PEETERS S.

CATEGORY OF CITED DOCUMENTS

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